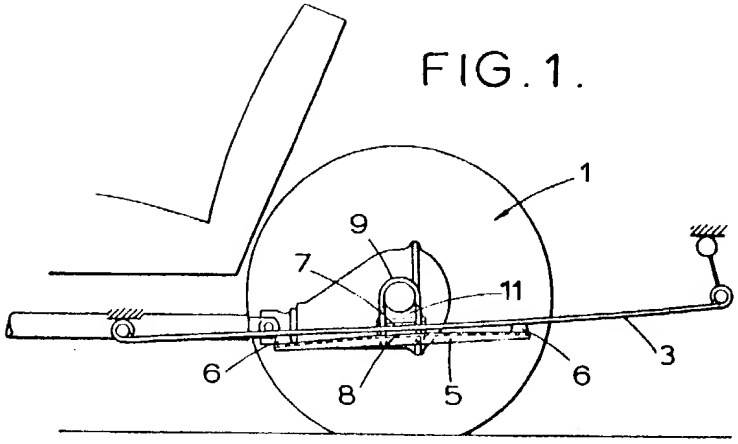
1203386 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

FIG. 1.



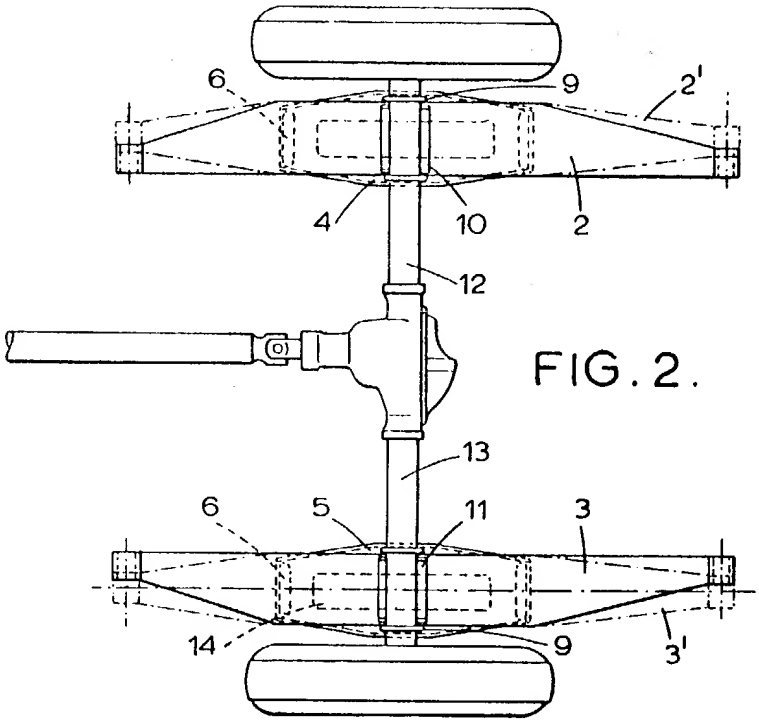


FIG. 2.

PATENT SPECIFICATION (11) 1 203 386

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DRAWINGS ATTACHED

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(54) AXLE SUSPENSION SYSTEMS

(71) We, FORD MOTOR COMPANY LIMITED, of 88 Regent Street, London W.1., a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to axle suspension systems.

Known axle suspensions in which a rigid axle is guided and suspended by longitudinally arranged multiple leaf springs have the disadvantage that friction develops between the several spring leaves and impairs the response of the suspension to slight road roughness. It has already been proposed to avoid this disadvantage by using a single-leaf spring which has a uniform thickness and a triangular or rhomboidal shape in plan instead of using a multiple leaf spring. However, these known triangular or rhomboidal leaf springs have the disadvantage that if they are longitudinally arranged they occupy a relatively large amount of space at the axle tubes so that they are difficult to install beneath the coachwork of a vehicle.

An object of the present invention is to provide an axle suspension for a rigid axle which does not have these disadvantages.

According to the present invention, there is provided an axle suspension for a rigid axle which is guided and suspended by longitudinally arranged leaf springs wherein the longitudinally arranged leaf springs are constructed as single leaf springs with a uniform thickness and which have, in plan view, a trapezoidal shape, which is either a trapezium having one long and one short side or a pair of trapeziums having a common side which is the centre of the spring, the springs lying intermediate the axle tubes the suspension including arms which extend generally longitudinally and horizontally beneath the springs the arms being rigidly secured to the axle tubes and provided with progressively acting rubber springs at their ends, and being arrange so that the rubber springs do not contact the leaf springs until the loading on the axle exceeds a predetermined value.

The arms may be bent in directions opposite to the bend of the single leaf spring to obtain a desired spring characteristic rate. They may be rigid and for example be U-shaped in section. The arms and the single leaf spring may be fastened to the axle tubes by clamping elements.

A single leaf spring which is shaped, in plan view as a trapezium having one long and one short side is preferably arranged so that the shorter side faces the vehicle wheel. The trapezoidal single leaf springs of a suspension according to the present invention have a relatively large width to take up side thrusts which provides excellent self-steering characteristics of the rigid axle.

In the accompanying drawings:

Fig. 1 is a side view of an axle suspension for a vehicle, with the vehicle half loaded, and

Fig. 2 is a plan view of the axle suspension of Fig. 1 which illustrates both the shapes which the leaf springs may take, one being shown in full and the other in broken lines.

The drawings illustrate a vehicle with a rigid axle 1 which is guided and suspended by longitudinally arranged leaf springs. The leaf springs are single leaf springs of uniform thickness but have, when viewed from above, a trapezoidal shape. Thus the springs 2^1 and 3^1 have a plan which is a pair of trapeziums having a common side which is the centre line of the spring. The plan of springs 2 and 3 is a trapezium having one long and one short side. The single leaf springs 2 and 3 or 2^1 and 3^1 are supported below and near their shorter edges by arms 4 and 5 which have progressively acting rubber springs 6 at their ends.

The arms 4 and 5 are curved in direction opposite to the curve of the single leaf springs 2 and 3 or 2^1 and 3^1. They may be essentially rigid arms having a U-shaped section. The

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arms 4 and 5 and the single leaf springs 2 and 3 or 2^1 and 3^1 are fastened, with interposed resilient seatings 7 and 8, to seatings 10 and 11 and to the axle tubes 12 and 13 by clamping elements 9. The resilient seatings 7 and 8 need not be provided if desired.

The curve of the single leaf springs 2 and 3 or 2^1 and 3^1 and the curve of the arms 4 and 5 are related to each other so that when the vehicle is unloaded the progressively acting rubber springs 6 do not bear on the single leaf springs. When the vehicle is e.g. half loaded, the rubber springs 6 begin to act and as the load is increased provide the desired progressively increasing spring characteristic.

The arms 4 and 5 may have central openings to reduce the weight and to avoid accumulation of dirt.

The arms 4 and 5 in addition to varying the spring characteristic by means of the rubber springs 6 also resist acceleration and braking moments. It is therefore advantageous to arrange telescopic shock absorbers in front of as well as behind of the axle tubes of the rigid axle which are connected between the axle and the body to dampen torsion movements of the rigid axle.

WHAT WE CLAIM IS:—

1. An axle suspension for a rigid axle is guided and suspended by longitudinally arranged leaf springs, wherein the longitudinally arranged leaf springs are constructed as single leaf springs with a uniform thickness and which have, in plan view, a trapezoidal shape, which is either a trapezium having one long and one short side or a pair of trapeziums having a common side which is the centre line of the spring, the springs lying intermediate the axle tubes the suspension including arms which extend generally longitudinally and horizontally beneath the springs, the arms being rigidly secured to the axle tubes and provided with progressively acting rubber springs at their ends, and being arranged so that the rubber springs do not contact the springs until the loading on the axle exceeds a predetermined value.

2. A suspension according to claim 1, wherein the arms are bent in a direction opposite to the bend of the single leaf springs and are secured to seatings on the axle tubes by clamping elements.

3. A suspension according to claim 1 wherein resilient seatings are arranged between the seatings on the axle tubes and the arms.

4. A suspension according to any preceding claim in which when the plan of the springs is a trapezium having one long and one short side the shorter of these sides is arranged facing the wheel supported by the axle.

5. A suspension according to any preceding claim wherein the torque arms have openings to reduce the weight and to avoid accumulation of dirt.

6. A suspension according to any preceding claim in which the rubber springs contact the leaf springs when the axle is more than half loaded.

7. An axle suspension substantially as described with reference to the accompanying drawings.

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